STRUCTURE 21

This structure is a reinforced concrete, gated spillway with discharge controlled by three cable operated, vertical lift gates. Operation of the gates is automatically controlled so that the gate hydraulic operating system opens or closes the gates in accordance with the operational criteria. The structure is located near the mouth of Canal 1 at its junction with Levee 31E and about 3500 feet from the shore of Biscayne Bay.

PURPOSE

This structure maintains optimum water control stages upstream in Canal 1; it passes the design flood (40 percent of the Standard Project Flood) without exceeding upstream flood design stage, and restricts downstream flood stages and discharge velocities to non-damaging levels; and it prevents saline intrusion during periods of high flood tides.

OPERATION

This structure will be operated to maintain an optimum headwater elevation which varies seasonally from a low of 2.0 feet during the dry season to a maximum of 2.4 feet, during the flood season, when sufficient water is available to maintain this level. The automatic controls in the gates function as follows:

High Range

When the headwater elevation rises to 2.4 feet, the gates will open at six inches per minute.

When the headwater elevation rises or falls to 1.9 feet, the gates will become stationary;

When the headwater elevation falls to 1.5 feet, the gates will close at six inches per minute.

Low Range

This setting is used only when the fall is unusually wet. Otherwise, the flood season setting is used throughout the year. If the dry season setting is used, it functions as follows:

When the headwater elevation rises to 2.0 feet, the gates will open at six inches per minute;

When the headwater elevation rises or falls to 1.5 feet, the gates will become stationary;

When the headwater elevation falls to 1.0 feet, the gates will close.

The selection of operational range will be based on the basin condition.

Salinity Regulation

In addition to maintaining optimum upstream fresh water control, as described above under Flood Control Regulation, the automatic controls on this structure have an over-riding control which closes the gates, regardless of the upstream water level in the rare event of a high flood tide, whenever the differential between the head and tailwater pool elevations reaches 0.2 feet.

FLOOD DISCHARGE CHARACTERISTICS

	Design	Standard Project Flood
Discharge Rate	2560 cfs	4300 cfs
	40% SPF	100% SPF
Headwater Elevation	1.9 feet	2.8 feet
Tailwater Elevation	1.4 feet	2.0 feet
Type Discharge	uncontrolled submerged	uncontrolled submerged
Estimated Maximum Hurricane Tide	15.6 feet m.s.l.	

DESCRIPTION OF STRUCTURE

Type fixed crest, reinforced concrete gated spillway

Weir Crest

Net Length 81.0 feet

Elevation -6.5 feet

Service bridge elevation 5.3 feet

Water level elevation which will by-pass structure 8.0 feet

Gates

Number 3

Size 10.7 feet high X 27.8 feet wide

Type vertical lift

Bottom elevation of gates full open 4.3 feet Normal
6.3 feet Maximum

Top elevation of gates full closed 4.2 feet

Control Automatic, on-site upstream control with over-ride differential water surface control sensed by bubbler system and remote computer control.

Lifting Mechanism

Normal power source commercial electricity

Emergency power source L.P. gas driven generator

Type hoist direct drive electric motor gear connected to gate by cable drums

Date of Transfer: March 25, 1963

ACCESS: from Coconut Palm Drive via spoil mound to the structure

Points of possible flooding

HYDRAULIC AND HYDROLOGIC MEASUREMENTS

Water Level Digital upstream and downstream recorders - on-site (U.S.G.S.) and remote on-site, upstream analog recorder

Gate Position Recorder Remote digital and on-site digital recorders on all gates.

Rain Gauge Remote digital recorder

DEWATERING FACILITIES

Storage needles at HomesteadField Station, beams at West Palm Beach Field Station

Type needle beams and vertical aluminum needles

Size and number (per bay)

Upstream & Downstream

Number 1 beam; needles, 6 @ 4', 1 @ 3' wide

Size beam 24WF160, length 28' -11"

needles 20' long